WSK

Water to water chillers and heat pumps

R407C

The WSK water chillers range have been designed for small and medium residential and commercial applications.
The WSK water chillers are suitable for water outlet temperatures at 7°C, commonly used in combinations with fan coils or/ and air handling units.
The WSK water chillers provide high efficiencies and quiet operation in any application.
The different versions allow the user to select the most suitable solution thanks to a wide range of accessories.

VERSIONS

- **WSK, cooling only version, available in 11 different sizes.**
- **WSK/HP, reversible heat pump version, available in 11 different sizes.**
- **WSK/EV, motoevaporating unit, available in 11 different sizes.**

ACCESSORIES

- **Hydraulic kit A1ZZ with: pump, expansion valve, safety valve, flow switch, insulated tank.**
- **Antifreeze kit (only for A versions).**
- **Hydraulic kit A1NT with: pump, expansion valve, safety valve, flow switch.**
- **LS low noise version.**
- **Partial heat recovery.**
- **Rubber or spring vibration dampers.**
- **Electronic soft starter.**
- **Manometers.**
- **Pressostatic valve.**
- **Remote control panel.**
- **Serial interface card RS485.**

WSK

Versions WSK ÷ WSK/HP		04	05	07	09	13	15	20	25	30	35	40
Cooling capacity [1]	kW	4,1	4,8	8,1	9,4	14,6	17,7	19,5	24,5	30,1	35,7	39,7
Compressors input power [1]	kW	1,1	1,2	1,9	2,4	4,2	4,1	4,8	5,9	7,2	8,5	9,7
Evaporator water flow [1]	m³/h	0,7	0,8	1,4	1,6	2,6	3,1	3,3	4,2	5,2	6,0	6,7
Condenser water flow [1]	m³/h	0,3	0,4	0,6	0,7	1,2	1,3	1,5	1,9	2,3	2,7	3,0
Heating capacity [2]	kW	4,9	5,7	9,6	11,0	17,6	20,7	22,7	28,5	35,0	41,4	46,5
Compressors input power [2]	kW	1,1	1,2	1,9	2,4	4,2	4,1	4,7	5,9	7,2	8,4	9,7
Evaporator water flow [2]	m³/h	0,9	1,0	1,7	2,0	3,1	3,7	4,0	5,0	6,2	7,3	7,9
Condenser water flow [2]	m³/h	0,6	0,7	1,2	1,3	2,0	2,5	2,7	3,5	4,3	5,2	5,8
Power supply		230V - 1 - 50 Hz				400/3+N/50						
Nominal input current	A	6,8	9,4	12,3	15,5	9,7	11,3	15,4	18,0	19,7	23,7	28,7
Peak current	A	34,0	42,0	68,0	75,0	68,0	77,0	102,0	126,0	129,0	169,0	201,0
Max input current	A	7,4	10,0	13,3	16,5	12,0	14,1	18,2	20,8	21,4	25,4	31,3
Compressors / Circuits	n°	Rotary 1/1				Scroll 1/1						
Evaporator / number		Plates / 1										
Condenser / number		Plates / 1										
Sound power level [3]	dB(A)	50	51	52	52	54	54	60	60	62	64	64
Sound pressure level [4]	dB(A)	42	43	44	44	46	46	52	52	54	56	56
Water pump	kW	0,13	0,13	0,2	0,2	0,3	0,45	0,45	0,45	0,55	0,55	0,9
Pump available static pressure	kPa	59	55	42	38	72	53	117	55	122	116	90
Water tank	l	40	40	40	40	40	40	40	40	40	40	40

[1] Cooling: data are refered to units complete with pressostatic valve, evaporator water temperature in/out 12/7°C, condenser water temperature in/out 15/30°C.
[2] Heating: condenser water temperature in/out 40/45°C; evaporator water temperature in/out 10/5°C. Without pressostatic valve.
[3] Sound power level according to ISO 3746.
[4] Sound pressure level at 1 mt from the unit in free field conditions direction factor Q = 2 according to ISO 3746.

Versions WSK/EV		04	05	07	09	13	15	20	25	30	35	40
Cooling capacity [5]	kW	4,1	5,2	7,5	8,7	13,7	15,9	18,2	25,0	29,3	35,2	43,9
Compressors input power [5]	kW	1,2	1,5	2,3	2,5	4,0	4,7	6,0	7,2	8,2	10,2	12,3
Water flow [5]	m³/h	0,7	0,9	1,3	1,5	2,4	2,8	3,2	4,3	4,9	6,1	7,4
Nominal input current	A	6,8	9,4	12,3	15,5	9,7	11,3	15,4	18,0	19,7	23,7	28,7
Peak current	A	34,0	42,0	68,0	75,0	68,0	77,0	102,0	126,0	129,0	169,0	201,0
Max input current	A	7,4	10,0	13,3	16,5	12,0	14,1	18,2	20,8	21,4	25,4	31,3
Power supply		230V - 1 - 50 Hz				400/3+N/50						
Compressors / Circuits	n°	Rotary 1/1				Scroll 1/1						
Evaporator / number		Piastre / 1										
Condenser / number		Not present										
Sound power level [3]	dB(A)	50	51	52	52	54	54	60	60	62	64	64
Sound pressure level [4]	dB(A)	42	43	44	44	46	46	52	52	54	56	56
Water pump	kW	0,13	0,13	0,2	0,2	0,3	0,45	0,45	0,45	0,55	0,55	0,9
Pump available static pressure	kPa	59	55	42	38	72	53	117	55	122	116	90
Water tank	l	40	40	40	40	40	40	40	40	40	40	40

[5] EV version: condensing temperature 50 °C, evaporator water temperature in/out 12/7 °C.
[3] Sound power level according to ISO 3746 (LS versions).
[4] Sound pressure level at 1mt from the unit in free field conditions direction factor Q = 2 according to ISO 3746 (LS versions).

WSK

FRAME
All WSK units are made from hot-galvanised thick sheet metal, painted with polyurethane powder enamel at 180°C to ensure the best resistance against the atmospheric agents. The frame is self-supporting with removable panels. All screws and rivets for outdoor installations are in stainless steel. The colour of the units is RAL 9018.

REFRIGERANT CIRCUIT
The refrigerant gas used in these units is R407C. The refrigerant circuit is made by using international primary brands components and according to concerning welding procedures. The refrigerant circuit includes: sight glass, filter drier, thermal expansion valve with external equalizer, reverse cycle valve (for heat pump version only), one way valve (for heat pump version only), liquid receiver (for heat pump version only), Schrader valves form maintenance and control, pressure safety device (according to PED regulation).

COMPRESSORS
The compressors are scroll type (rotative type for sizes 04,05,07 only), with crankcase heater and thermal overload protection by a klixon embedded in the motor winding. The crankcase heater, when present, is always powered when the compressor is in stand-by. The inspection is possible through the frontal panel of the unit that allows the maintenance of the compressors even if the unit is working.

CONDENSERS AND EVAPORATORS
The evaporators and the condensers are made of AISI 316 stainless steel braze-welded plates type. The use of this kind of evaporators allows a massive reduction of the refrigerant charge of the unit compared to the traditional shell-in-tube evaporators and also. The evaporators are factory insulated with flexible close cell material and can be equipped with antifreeze heater (optional). In the heat pumps versions the condensers are factory insulated with flexible close cell material and can be equipped with antifreeze heater .Each evaporator is provided with a temperature sensor as antifreeze protection.

MICROPROCESSOR
All WSK units are supplied standard with microprocessor controls. The microprocessor controls the following functions: regulation of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence, alarm reset, potential free contact for remote general alarm, alarms and operation leds. Upon request any microprocessor can be connected to a BMS system for the remote control and management. The technical department is available to study, together with the customer, different solutions using MODBUS; LONWORKS; BACNET or TREND protocols.

ELECTRIC BOX
The electric box is made according to electromagnetic compatibility norms CEE 73/23 and 89/336. The accessibility to the board is possible after removing the front panel of the unit. In all WSK units are installed, standard, the compressors sequence relay which disables the operation of the compressor in case the power supply phase sequence is not the correct one (scroll compressors in fact, can be damaged if they rotate reverse wise). The following components are also standard installed: main switch, magnetic-thermal switches (as a protection of pumps), compressors fuses, control circuit automatic breakers, compressor contactors, pump contactors. The terminal board is supplied with voltage free contacts for remote ON-OFF , Summer / winter change over (heat pumps only) and general alarm.

CONTROL AND PROTECTION DEVICES
All units are supplied with the following control and protection devices: Return water temperature sensor, installed on the return water line from the plant (12°C), antifreeze protection sensor installed on the outlet water temperature (7°C), high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, fans thermal overload protection, plate mechanical flow switch.

MOTOEVAPORATING VERSIONS EV
This version includes a microprocessor control to manage the compressor and alarms timings. The refrigerant gas is R407C. This unit has only a nitrogen charge.

HEAT PUMP VERSIONS HP
The heat pump versions are provided with a 4 way reverse cycle valve and are suitable to produce hot water up to a temperature of 50°C. They are always supplied with liquid receiver and a second thermostatic valve to optimize the efficiency of the refrigerant cycle in heating and in cooling. The microprocessor is set for automatic defrost (in case of operation in severe ambient conditions) and for summer/winter change over.

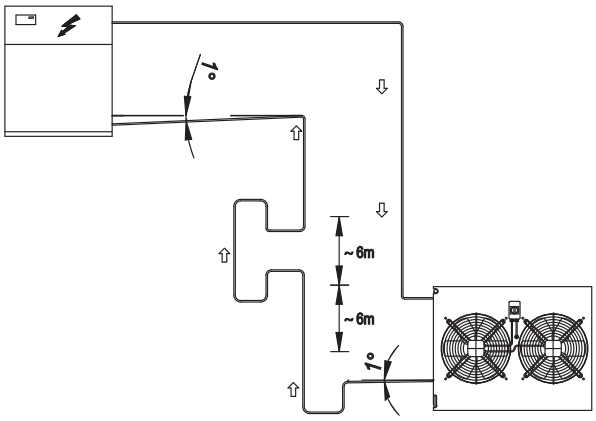
MOTOEVAPORATING UNITS REFRIGERANT CONNECTIONS

Motoevaporating unit WSK/EV must be connected to the indoor unit by refrigerant lines. The condensing units are supplied without refrigerant charge and filled with nytrogen.

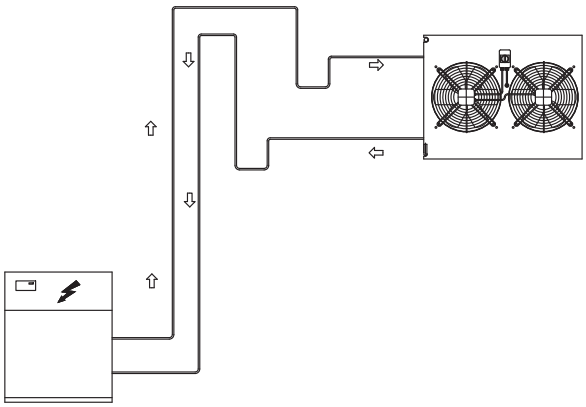
Piping layout and max distance betneen the sections.
On split-system applications, piping layout is determined by sections location and building structure. Piping should be as shorter as possible in order to reduce pressure drops in refrigerant circuit and the refrigerant charge in the system. Maximum admitted pipe length is 30 meters.
Our technicians are available to study other kinds of applications which don't respect the limits reported above.

WSK/EV remote condenser installed at a higher level than the compressors
Install a collection pit on discharge and return line so that liquid refrigerant, when the system is not running, can be collected by this pit, avoiding its return to compressor heads, and possible failure; On horizontal pipelines a minimum 1% slope should be allowed in order to drain oil in the proper flow direction.

WSK/EV remote condenser installed at a lower level than the compressors
On the rising vertical pipes, oil traps should be fitted every 6 metres to allow oil circulation in the system; On horizontal pipelines a minimum 1% slope should be allowed in order to drain oil in the proper flow direction.
The refrigerant line diameters can be obtained by the refrigerant circuit, depending on the selected size and the distance between the indoor and the outdoor unit.



WSK/EV higher than the remote condenser



WSK/EV lower than the remote condenser

WSK

Refrigerant line diameters for “EV” versions						
Distance (m)	10		20		30	
Mod.	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)
04	10	8	10	10	---	---
05	10	8	12	10	---	---
07	12	10	16	10	---	---
09	12	10	16	12	16	12
13	16	12	16	12	16	16
15	16	12	16	16	18	16
20	16	12	18	16	18	16
25	18	16	18	16	22	16
30	18	16	22	16	22	18
35	22	16	22	16	22	18
40	22	16	22	18	22	18

Refrigerant charge for liquid line			
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m
8 (mm)	30	12 (mm)	85
10 (mm)	55	16 (mm)	165
18 (mm)	215	---	---

Cooling capacity correction factors				
Mod.	Refr. Line 0 mt.	Refr. Line = 10 mt.	Refr. Line 20 mt.	Refr. Line 30 mt.
WSK/EV	1	0,98	0,96	0,95

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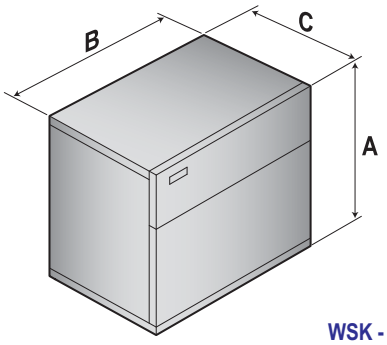
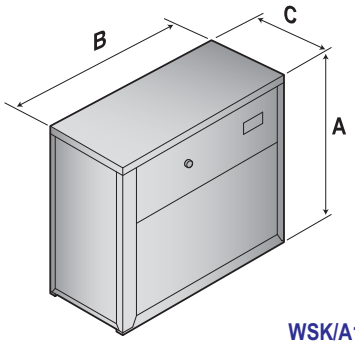
Model WSK ÷ WSK/EV ÷ WSK/HP	Code	04	05	07	09	13	15	20	25	30	35	40
Main switch	-	-	-	-	-	●	●	●	●	●	●	●
Flow switch	-	●	●	●	●	●	●	●	●	●	●	●
Microprocessor control	-	●	●	●	●	●	●	●	●	●	●	●
LS low noise basic version	LS01	O	O	O	O	O	O	O	O	O	O	O
LS low noise A1 version	LS01	O	O	O	O	O	O	O	O	O	O	O
Partial heat recovery	RP00	-	-	-	-	O	O	O	O	O	O	O
Spring vibration dampers	KAVM	O	O	O	O	O	O	O	O	O	O	O
Rubber vibration dampers	KAVG	O	O	O	O	O	O	O	O	O	O	O
Manometers	MAML	O	O	O	O	O	O	O	O	O	O	O
Kit valvola pressostatica per versione solo freddo	VPSF	O	O	O	O	O	O	O	O	O	O	O
Kit valvola pressostatica per versione a pompa di calore	VPRV	O	O	O	O	O	O	O	O	O	O	O
Electronic soft starter	DSSE	O	O	O	O	O	O	O	O	O	O	O
Remote control panel	PCRL	O	O	O	O	O	O	O	O	O	O	O
Serial interface card RS485	INSE	O	O	O	O	O	O	O	O	O	O	O
Hydraulic kit A1ZZ with tank and one pump	A1ZZ	O	O	O	O	O	O	O	O	O	O	O
Hydraulic kit A1NT with one pump without tank	A1NT	O	O	O	O	O	O	O	O	O	O	O

● Standard, O Optional, – Not available.



WSK - WSK/EV

WSK	A (mm)	B (mm)	C (mm)	Kg
04/05	770	550	570	75/80
07/09	770	550	570	87/95
13/15	940	700	570	110/118
20/25	940	700	570	130/138
30/35	940	700	570	144/152
40	940	700	570	164



WSK/A1 - WSK/A1/EV

WSK/A1	A (mm)	B (mm)	C (mm)	Kg
04/05	1280	1003	633	93/98
07/09	1280	1003	633	105/113
13/15	1280	1003	633	128/136
20/25	1280	1003	633	145/159
30/35	1280	1003	633	170/185
40	1280	1003	633	195